(12) UK Patent Application (19) GB (11) 2 316 354 (13) A

(43) Date of A Publication 25.02.1998

(21) Application No 9617221.8

(22) Date of Filing 16.08.1996

(71) Applicant(s)
Scapa Group Plc

(Incorporated in the United Kingdom)

Oakfield House, 93 Preston New Road, BLACKBURN, Lancashire, BB2 6AY, United Kingdom

(72) Inventor(s)
Sanjay Patel

(74) Agent and/or Address for Service
Wilson Gunn M'Caw
41-51 Royal Exchange, Cross Street, MANCHESTER, M2 7BD, United Kingdom

(51) INT CL^6
D21F 1/00 1/12

(52) UK CL (Edition P)
B5K K3J
C3V VEE
D1W W1
F2Q Q2C4

(56) Documents Cited
US 4938269 A
WPI Absract Accession No. 90-366271 & JP02265424A
WPI Abstract Accession No: 87-043583 & JP62051940A

(58) Field of Search
UK CL (Edition O) B5K K3J, B8A ALA, C3V VEE, D1W W1
INT CL^6 D21F 1/00 1/12, F16G 3/02
ONLINE : WPI

(54) Pintle wires

(57) A pintle wire for joining the ends of a fabric to form an endless belt comprises one or more strands, as a monofilament or a braided etc cable, in which the or at least one of the strands includes or is coated with a self luminous material so that the pintle wire can be seen in dark or poor light conditions to aid threading etc. The material may be luminescent, phosphorescent or fluorescent and examples of each type are given.

GB 2 316 354 A

IMPROVEMENTS IN PINTLE WIRES

This invention concerns improvements in pintle wires.

Pintle wires are used to join the ends of a web or fabric to form an endless belt. Such end of the web is provided with a series of outwardly extending loops, the two sets of loops being interdigitable, so that they can be joined by a pintle wire which is threaded through the loops.

Such an arrangement is particularly used in paper machine clothing for example, press felts and dryer fabrics. Because papermachine clothing has to be changed for repair, refurbishment or replacement in situ on the machine, the task often has to be accomplished in poor lighting conditions within a machine body. In such conditions, even with the aid of a flashlight or the lighting provided, it is difficult to see the pintle wire and the loops, and to ensure that all the loops are correctly threaded by the pintle wire. Flaws created by the missing loops can have a detrimental effect on the uniformity of the paper or board being produced.

It is accordingly an object of the invention to provide a means whereby it can be better ascertained whether or not a pintle wire has been correctly threaded, as well as to make it easier to do so.

This invention therefore provides a pintle wire, characterised in that said pintle wire is adapted to glow in dark or low-light conditions.

The pintle wire, may be comprised of a polymer matrix, extruded to form the pintle wire as a single continuous polymer strand, and the matrix may include one or more materials which are self-luminous, luminescent, phosphorescent or fluorescent.

The material included in the polymer matrix is preferably a UV-sensitive material which appears to glow when exposed to UV light (such materials, known as optical brightening agents are used for example in detergents, and act by re-emitting UV radiation as intense white light).

The pintle wire may be treated with a solution of the optical brightening agent to leave a deposit of the agent on or at the wire surface.

Alternatively a phosphorescent material may be deposited onto the pintle wire surface, or a combination of a phosphorescent and a fluorescent material.

In the case of pintle wires which comprise multifilament, braided, twisted, cabled or plied yarns, at least one yarn, fibre, strip or ribbon of one or more materials which are self-luminous, luminescent, phosphorescent or fluorescent may be incoporated into such pintle wires.

The end loops of the fabric to be joined by a pintle wire may be treated in this way also, or instead.

Preferred examples of the invention will now be described in more detail.

Example 1

A pintle wire, extruded from a matrix of polymer material is treated with a solution, 0.001-3.00% by weight, in a neutral or weakly alkaline aqueous solvent, at a temperature in the range 20-70°C; alternatively an organic solvent for a thermosolving process at 20-150°C may be used; of an optical brightening agent. After drying, a deposit of the agent is left on the surface of the pintle wire.

The optical brightening agent is a UV-sensitive material which appears to glow when exposed to UV light, re-emitting adsorbed UV light as an intense

white light. The following are examples of optical brightening agents which may be used:-

(a) 3,5-diaminopyrazine-2,6-dicarboxylic acid derivatives,

(b) bis-v-triazolyl-stilbene derivatives;

(c) 1,4-bis-(carbalkoxybenzoxazolyl)-napthalene derivatives, and

(d) triazolylstyryl compounds.

The wire thus coated must be illuminated by a UV-source, but stands out clearly from the background and thus can be clearly seen during insertion through the end loops of the fabric, and after placement, the other compounds remaining dark. The UV-sensitive material preferably absorbs at a wave length greater than 300nm, e.g. in the region about 360nm.

Example 2

A UV-sensitive material as set forth in Example 1 above is added to the polymer matrix before extrusion or melt spinning of the polymer to form the wire. The UV-sensitive material is dispersed throughout the wire, including its surface, and has the advantage over the coating method of example 1, that abrasion of the wire will expose more of the UV-sensitive material, instead of wearing off the coating.

Example 3

To the polymer matrix is added a phosphorescent material, again before extrusion or spinning. This produces a wire which will glow in the dark without need for any illumination. Possible materials which are used include the following:-

(a) phosphorescent pigment No. 2230 of Optonix Inc.

(b) activated solid metal pigments, e.g. zinc sulphide; calcium sulphide; strontium sulphide; cadmium sulphide; or barium sulphide; the activator being for instance copper.

(c) magnesium sulphide aniline dyes.

The uniformity of the dispersion of the phosphorescent material may be improved by the addition of aluminium stearate (typically 1 to 4 parts by weight of aluminium stearate to 15-20 parts by weight pigment). Alternatively, a wetting agent such as a mineral oil compatible with the yarn matrix polymer can be used to wet the yarn matrix polymer pellets to promote adhesion of the pigment particles to the polymer prior to extrusion or melt spinning, the wetting agent being added in an amount of up to 8% by weight, preferably 0.1-5% by weight. The pigment may be suspended in a plastisol (i.e. polymer dissolved in plasticiser).

To improve the compatibility between the phosphorescent particles and yarn polymer matrix, the particles may be coated with a coupling agent, preferably a silane or titanate compound, such as Union Carbide's A151 silane coupling agent. The mean particle size is typically no greater than 50 microns, preferably 1-30 microns. The fibres generally contain 1-35% by weight, preferably 2.5-15% by weight of phosphorescent material.

Example 4

A mixture of phosphorescent material, as set out in Example 3, with a fluorescent material may be added to the polymer before extrusion or spinning. The phosphorescent material may be any of those set out in Example 3, whilst the fluorescent material may be any one or more of:-

(a) Rhodamine, dyes (e.g. Rhodamine B);

(b) Fluorescein dyes;

(c) Uranine dyes (e.g. Uranine S).

The UV-sensitive, phosphorescent or fluorescent materials may be combined with each other and/or with conventional pigments or dyes, optionally encapsulated, or with thermochromic or photochromic dyes.

The pintle wire (or loops on the ends of the fabric) thus treated or formed, can be clearly seen even in darkness. In the case of Examples 1 and 2 using UV-sensitive materials, a UV source is required. In the cases of Examples 3 and 4 using phosphorescent or fluorescent material, no external energy source is required. The pintle wire can be seen for installation even in dark locations, and it can readily be seen to ensure that the pintle wire has been installed correctly. It may also be used as a readily visible reference marker to aid fabric alignment when the fabric is running on the machine.

CLAIMS

1. A pintle wire, characterised in that said pintle wire is adapted to glow in dark or low light conditions.

2. A pintle wire according to claim 1, characterised in that said pintle wire is comprised of a polymer matrix which is extruded to form the pintle wire as a single continuous polymer strand, said polymer matrix including one or more materials which are self-luminous; luminescent; phosphorescent or fluorescent.

3. A pintle wire according to claim 2, wherein said material included in the polymer matrix is a UV-sensitive material, which appears to glow when exposed to UV light.

4. A pintle wire according to claim 3, wherein said material is provided by treating the pintle wire with a solution of the UV-sensitive material to leave a deposit thereof on or at the pintle wire surface.

5. A pintle wire according to claim 1, wherein said pintle wire comprises multifilament, braided, twisted, cabled or plied yarns, characterised in that at least one yarn fibre, strip or ribbon comprises or includes one or more materials which are self-luminous, luminescent, phosphorescent or fluorescent, as incorporated in said pintle wire.

6. A pintle wire according to claim 3 or 4, wherein said UV-sensitive material is selected from the group comprising:-

a) 3,5-diaminopyrazine-2,6-dicarboxylic acid derivatives;

b) bis-v-triazolyl-stilbene derivatives;

c) 1,4-bis-(carbalkoxybenzoxazolyl)-napthalene derivatives; and

d) triazolylstyryl compounds.

7. A pintle wire according to claim 1, claim 2 or claim 5, wherein the said material is a phosphorescent material.

8. A pintle wire according to claim 7, wherein said phosphorescent material is phosphorescent pigment No. 2230 of Optonix Inc.

9. A pintle wire according to claim 7, wherein the phosphorescent material is an activated solid metal pigment.

10. A pintle wire according to claim 9, wherein said phosphorescent material is a metal sulphide.

11. A pintle wire according to claim 10, wherein said sulphide is selected from the group comprising:- zinc sulphide; calcium sulphide; strontium sulphide; cadmium sulphide; and barium sulphide.

12. A pintle wire according to any one of claims 9 to 11, wherein the activator is copper.

13. A pintle wire according to claim 7, wherein the phosphorescent material is a magnesium sulphide aniline dye.

14. A pintle wire according to any of claims 7 to 13, wherein aluminium stearate is added in a ratio of 1-4 parts by weight aluminium stearate to 15-20 parts by weight phosphorescent material.

15. A pintle wire according to any of claims 7 to 13, wherein a mineral oil is used to wet the matrix polymer to promote adhesion of the phosphorescent material particles to the polymer prior to extrusion of melt spinning.

16. A pintle wire according to claim 15, wherein the wetting agent is added in an amount of up to 8% by weight.

17. A pintle wire according to claim 16, wherein the wetting agent is added in an

amount of 0.1-5% by weight.

18. A pintle wire according to any of claims 7 to 17, wherein said phosphorescent material is in the form of particles which are coated with a coupling agent.

19. A pintle wire according to claim 18, wherein the coupling agent is a silane compound.

20. A pintle wire according to claim 18, wherein the coupling agent is a titanate compound.

21. A pintle wire according to any of claims 18 to 20, wherein the mean particle size is no greater than 50 microns.

22. A pintle wire according to any of claims 7 to 21, wherein the matrix contains 1-35% by weight of phosphorescent material.

23. A pintle wire according to claim 22, wherein the matrix contains 2.5 - 15% by weight of phosphorescent material.

24. A pintle wire according to any preceding claim, containing a fluorescent material added to the polymer before extrusion or spinning.

25. A pintle wire according to claim 24, wherein the fluorescent material is selected from the group comprising:-

a) Rhodamine dyes;

b) Fluorescein dyes;

c) Uranine dyes.

The Patent Office

9.

Application No: GB 9617221.8 **Examiner:** Dave McMunn
Claims searched: 1-25 **Date of search:** 11 July 1997

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): B5K (K3J). B8A (ALA). C3V (VEE). D1W (W1).

Int Cl (Ed.6): D21F 1/00, 1/12. F16G 3/02.

Other: ONLINE : WPI

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	US 4,938,269 (NICHOLAS & DIEHL). See e.g. lines 59 to 61, column 2.	1, at least
X	WPI Abstract Accession No. 90-366271 & JP 2265424 A (MITSUBISHI) 04.04.89 (See Abstract)	1,2,24,25
X	WPI Abstract Accession No. 87-043583 & JP 62051940 A (TORAY) 09.02.85 (See Abstract)	1,2,24,25

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.